California Environmental Protection Agency
Department of Pesticide Regulation
Forest Herbicide Monitoring Report

Environmental Monitoring Branch
1001 I Street, P.O. Box 4015
Sacramento, CA 95812-4015

Progress Report #3 (Final Issue) May 2001

Residues of Forestry Herbicides in Plants of Interest to California Tribes

In recent years, California tribal people have voiced concerns about exposure to herbicides used in national forests. They are concerned because they live and gather food, medicinal, ceremonial and basketry plant materials in or near these forests. As a result, the U.S. Forest Service funded the California Department of Pesticide Regulation (DPR) to assess the potential exposure of plant gatherers and users to forestry herbicides.

We (DPR) have completed a three-year field monitoring study, in consultation with the local California Indians residing near or in the Stanislaus, Sierra, and Eldorado National Forests. The study was designed to (1) find the length of time herbicides remain in selected plants (dissipation), and (2) determine how far herbicides move from the treatment areas (offsite movement). This is our final report.

Manzanita, 28 weeks after triclopyr treatment

The Herbicides

In the National Forests four herbicide- and application-method combinations were selected for monitoring: Pronone® 10G (hexazinone) by helicopter; and Velpar® L (hexazinone), Accord® (glyphosate), and Garlon® 4 (triclopyr) by backpack sprayer.

Goldenfleece, 8 weeks after glyphosate treatment

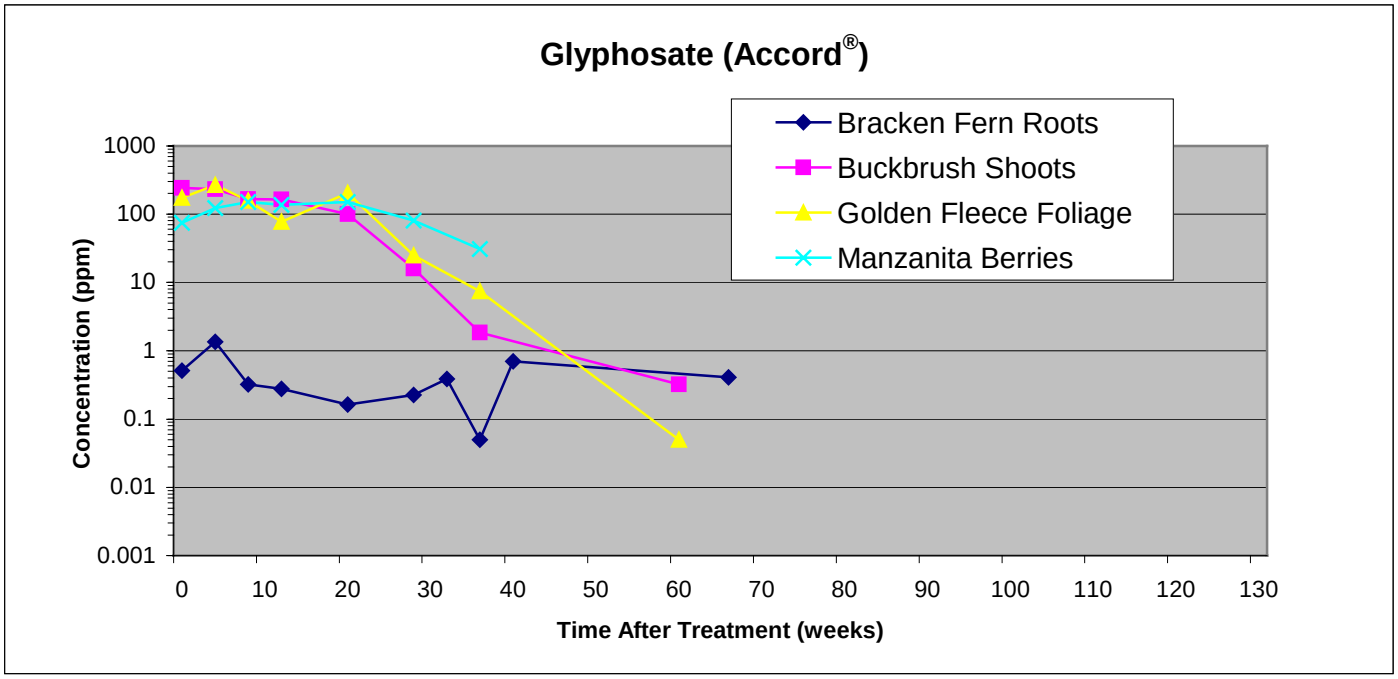
Four plant types were selected to determine how long the herbicides last after they are treated: buckbrush shoots, golden fleece foliage, bracken roots, and manzanita berries. Samples were collected every four to eight weeks until herbicide residues were no longer detected. To test how far herbicides move, samples were collected at four distances between 5 to 100 feet from the edge of the treated area. Samples of the four plant types were collected within one to three days after the treatment, then four weeks, and then 12 weeks after treatment.

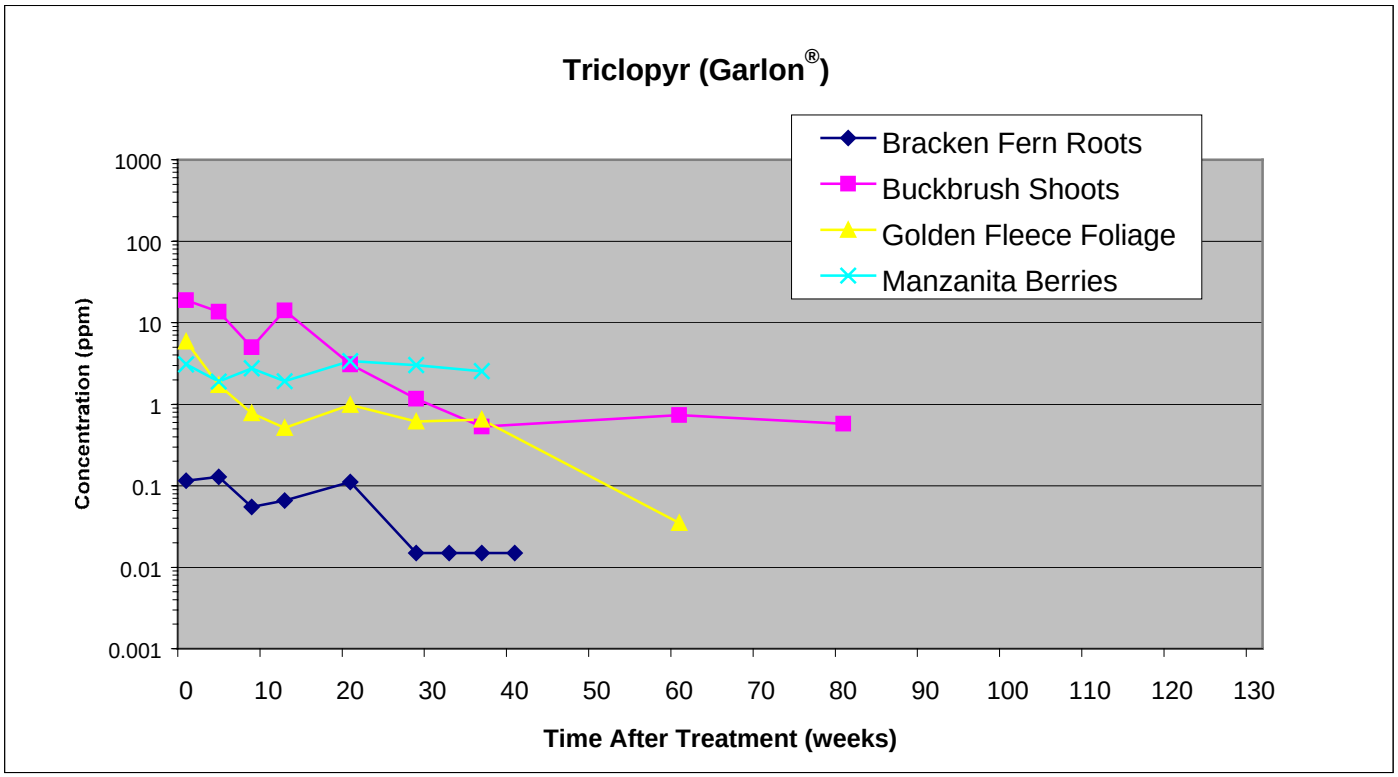
Herbicide Dissipation

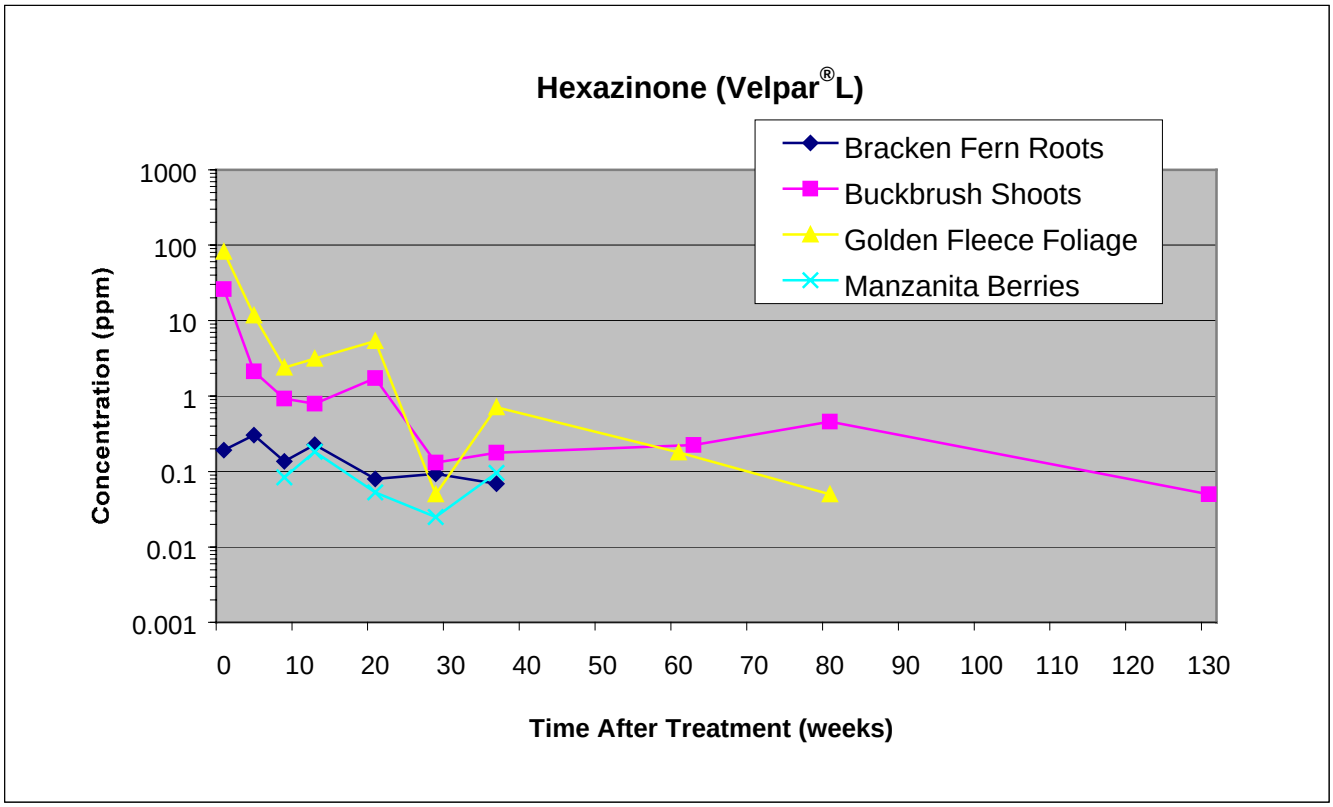
For plants that were sprayed directly, results collected from the National Forests since 1997

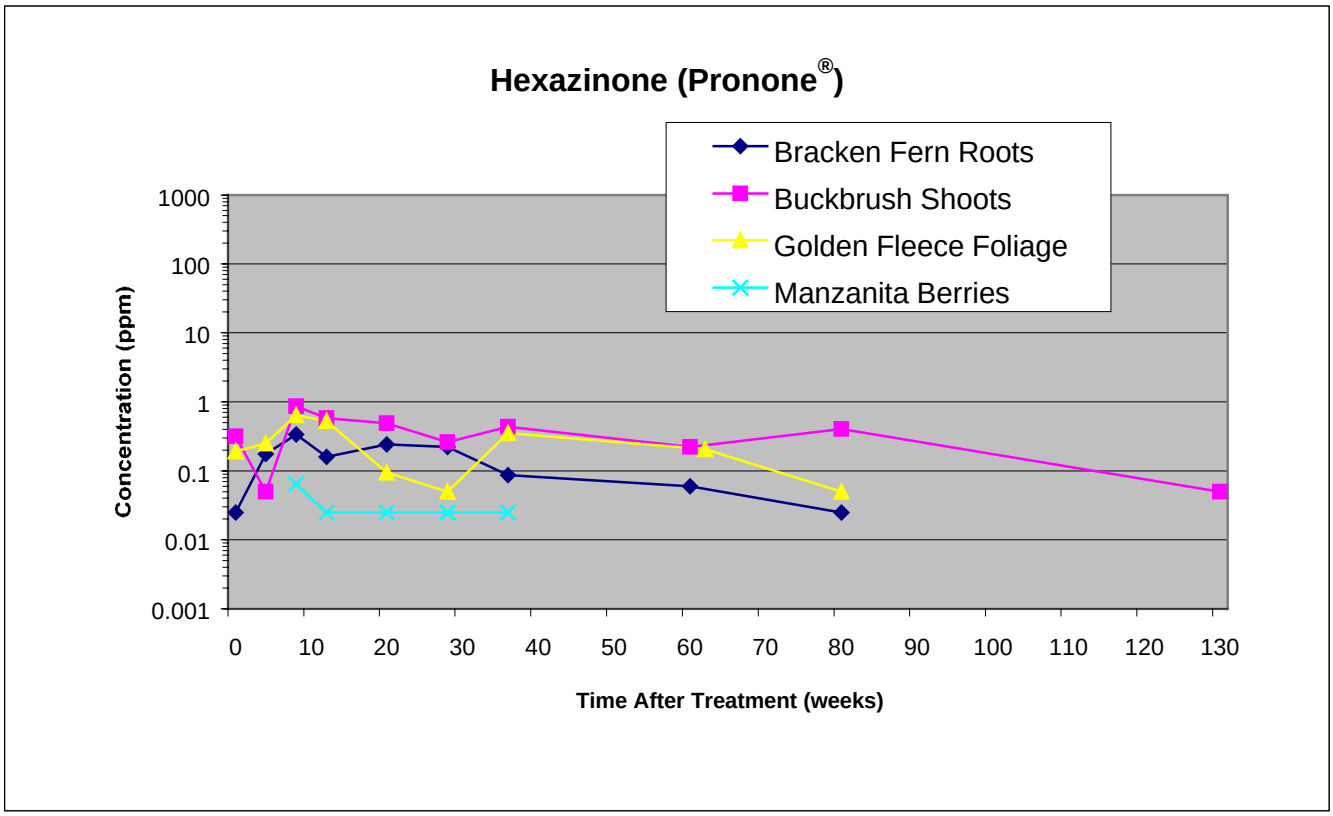
show a general trend of declining residue levels through time. Generally herbicides were no longer detectable or plant materials were no longer available after 80 weeks. In some cases, plant materials such as buckbrush shoots contained low levels of hexazinone (less than 0.1 ppm) up to 130 weeks after treatment. These plant materials were mostly dead after 28 weeks; samples were taken from shoots with some regrowth of new foliage.

The following charts show decline of herbicides in the four plant materials:






Hexazinone (Velpar®L)
Bracken Fern Roots
Buckbrush Shoots
Golden Fleece Foliage
Manzanita Berries
Concentration (ppm)
1000
100
10
1
0.1
0.01
0.001
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Time After Treatment (weeks)


Hexazinone (Pronone®)
Bracken Fern Roots
Buckbrush Shoots
Golden Fleece Foliage
Manzanita Berries
Concentration (ppm)
1000
100
10
1
0.1
0.01
0.001
0
10
20
30
40
50
60
70
80
90
100
110
120
130
Time After Treatment (weeks)

Offsite Movement

Incidents of drift from sprayed areas were low at 7.9% of the samples collected. Most of the residues were detected within 70 feet from the edges of sprayed areas. These low incidents are attributable to ground hand-application using backback sprayers for the liquid herbicides. Although granular hexazinone was applied by helicopter, it has relatively low drift because these heavy granules tend to fall directly onto the targeted treatment site.

Buckbrush 28-weeks after glyphosate/triclopyr treatment

Herbicides detected at various distances from the treated forest edge from National Forests, Calif. 1997-2000.

			No. of positive samples			
Herbicide	No. site	No. sample	5-15 ft	20-40 ft	50-70 ft	80-100 ft
Glyphosate	6	72	5	2	0	0
Triclopyr	3	36	2	2	2	1
Hexazinone (liquid)	5	60	0	0	1	1
Hexazinone (granules)	6	72	1	0	2	0

We acknowledge the support of and collaboration by our tribal consultants, California Indian Basketweavers Association, staff from USDA Forest Service, and U.S. EPA. These project was partly funded by USDA Forest Service grant G-5-98-20-025. DPR is an equal opportunity service provider. Mention of commercial products does not imply endorsement by the DPR.

For more information about this project, please access our web page at www.cdpr.ca.gov under "National Forest Herbicide Monitoring Project." For a detailed report or more information, please contact Kean S. Goh at (916) 324-4072, or kgoh@cdpr.ca.gov.

Sampling bracken fern roots 20-weeks after treatment with hexazinone granules.